Cylindrical Mirror Anamorphosis

Create mystery art that reveals its secrets when viewed with a tube-shaped mirror.

Kit contains:

- 1 flexible mirror
- 2 paper clips
- 3 anamorphic mystery pictures
- 2 mystery art templates

You will need: colored pencils (best) or other drawing supplies.

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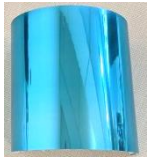
An **anamorphosis** is a distorted image that appears in natural form under certain unusual conditions. In this activity, you are exploring **cylindrical mirror anamorphosis**, which means that the super-weird pictures will reveal their true forms when reflected in a tube-shaped mirror.

PART 1: INVESTIGATE

You have three anamorphic mystery pictures to investigate.

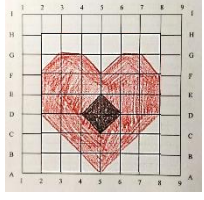


To create your cylindrical mirror: Peel the blue protective film off the mirror. Keep the grid backing! Roll the mirror so that the diameter matches the circle on the mystery pictures. Secure with paper clips.

Place the cylinder on each mystery picture circle. Can you see the hidden images?

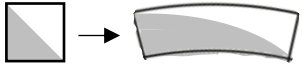
PART 2: CREATE

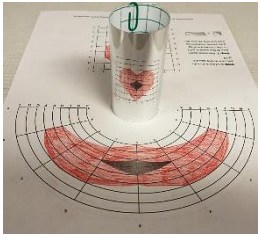
Your STEMonade kit also contains two mystery art templates (back-to-back). These will let you make your own anamorphic pictures.



Step 1. Draw a simple picture on the square grid. You do not need to use the whole space.

Step 2. Recreate each square box in the corresponding **polar grid**, stretching and curving as you go. This gives the effect of pulling your image into a half-circle around an invisible center.

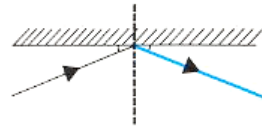


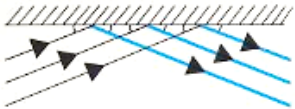


Step 3. Resize your mirror tube and view your mystery art. Does the reflected anamorphic picture now look like your original?

CYLINDERS ARE SERIOUSLY SILLY!

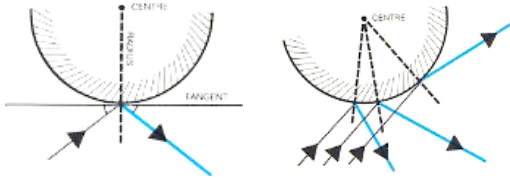
When a beam of light hits a reflective surface, it bounces off at the exact same angle. We call this the **Law of Reflection**.





On a flat mirror, parallel beams of light end up parallel in their reflections. There is no distortion.

On a cylinder, parallel beams of light hit the mirror at all different angles, so they reflect at those specific different angles. That's why the overall image in the mirror looks weird.



Anamorphic pictures reproduced from The Magic Mirror: An Antique Optical Toy *by the McLoughlin Bros. (1979)*
Other source: The Magic Cylinder Book: Hidden Pictures *to Colour and Discover by Ivan Moscovich (1988)*